

- [0043] Figure 20 is a partial sectional view of the bayonet mount of the tube cover of Figure 15;
- [0044] Figure 21 is a cross-sectional view of an alternative embodiment of a pipe cover of Figure 14 with a snap-in connection;
- [0045] Figure 22 is an end view of the pipe cover of Figure 21;
- [0046] Figure 23 is a plumbing strap for use with the pipe cover of Figure 14;
- [0047] Figure 24 is an enlarged view of a portion 24-24 of Figure 23; and
- [0048] Figure 25 is another view of the plumbing s trap of Figure 23;

## Detailed Description

### Plumbing Strap

[0049] Referring to Figures 1-3, a support 20 is provided for tubing 22. The tubing can comprise water pipes, plumbing pipes, gas pipes, electrical conduit, or tubing for other items. The following description will refer to the tubing 22 in the context of water pipes as typically used in homes and buildings. The tubing typically runs vertically inside a wall of a building, between adjacent studs 24 of the building. These studs 24 are typically 16 or 24 inches apart in most houses. At the location where the water pipes 22 are to come out of the wall, the pipes bend at 90° and extend perpendicular to the wall. To hold the pipes 22 as they extend from the wall, the support 20 is provided.

[0050] The support 20 is sometimes referred to as a plumbing strap, especially when used to hold plumbing pipes. The support 20 preferably comprises an elongated strip of material, typically metal, that has a plurality of openings 26 provided at predetermined locations along a longitudinal axis 27 of the strap. The support 20 is preferably as thin and as flat as possible so that it can be interposed between a sheet of drywall and the studs 24 and not cause a perceptible deformation of the drywall when viewed from the inside of the room. But if no drywall is used, other shapes can be used including straps 20 that are not flat strips of metal, but have stiffeners or other devices on them. On the other hand, even if drywall is used, installation techniques can allow for a degree of relief in the strap, so that it is not necessary for the strap to be completely flat to be used with drywall. For ease of description, however, the support 20 will be referred to as a flat strap

with holes through the thin dimension of the strap. But the scope of the invention is not so narrow, and is to be construed as broadly as the prior art and claims permit.

[0051] The openings 26 are sized to allow the pipes 22 to pass through the openings, but close enough to the outer diameter so the strap can be soldered to the pipe. The shape of the openings 26 preferably correspond to the shape of the outer periphery of the tubing 22, and the edges of the opening 26 preferably are close enough to the outer periphery of the tubing 22 so the edges of the opening 26 can be soldered to the tubing 22 around the periphery of the opening 26. Because the pipes are typically circular in cross-section, the openings 22 are typically circular. But other shapes can be used. A single strap 20 can have various sized openings 26, and they need not be all the same size as shown in the illustrations.

[0052] Intermediate the openings 26 are optionally, but preferably, placed at least one hole 28 sized to allow passage of a fastener 30 used to fasten the strap to the building structure such as studs 24. The fasteners 30 typically comprise nails, screws or staples, with the holes 28 sized and configured to correspond to the fasteners used. As shown in Figure 1, a single hole 28 is provided half way between the centers of adjacent openings 26, preferably on the longitudinal axis 27. Other locations and different numbers of holes 30 can be provided.

[0053] Additionally, a plurality of holes 28 are also located at opposing ends of the strap or strap 20. As shown in Figure 1, two holes 28 are on the left end 34 and six holes 28 are on the right end 36. The holes allow the strap 20 to be used with a variety of stud spacings while still providing intermediate holes for nails, screws etc. through the strap.

[0054] The strap 20 has an edge 38 around the periphery of each opening 26. The edge 38 is not in the plane of the flat strap containing the opening 26 in the strap 20. In particular, and as best seen in Figures 2-3, the edge 38 of the opening 26 undulates. Preferably the undulation of edge 38 extends on opposing sides of the plane containing the opening 26. As shown in Figure 2, the undulation is formed by bending a portion of the edge 38 outward from the plane containing the opening 26, along the longitudinal axis 37 of the pipe that will extend through the opening, or orthogonal to the plane containing the opening. The edge 38 is shown in Figure 3 as having a curved shape, preferably sinusoidal, although deformations with various combinations of curves or of curves and straight lines (Figs. 5-6) can be used.

[0055] Depending on the way the undulating edge 38 is made, the displacement of the edge 38 away from the strap can cause various shaped flutes 39. Each flute 39 has a base 40 which forms a portion of the periphery of the opening 26 which opening is defined by the undulating edge 38. The base 40 extends along axis 37, out of the plane of the strap 20 which contains longitudinal axis 27. The distal ends of the base 40 lie in or pass through the plane of the strap 20 but those distal ends lie on the periphery 38 that forms the opening 26. The center of the base 40 is offset from the plane of the strap 20 containing the opening. Outward of the opening 26 is a smaller end, an apex 42, which is located in or very near to the plane of the strap 20 that contains the longitudinal axis 27. From the apex 42, preferably in the radial direction toward the center of opening 26, the flute 39 increases in dimension both in the plane of the strap 20, and in the direction orthogonal to that strap 20. Thus, each flute 39 has an enlarged opening extending toward the periphery 38, and forming a portion of the periphery, with a longitudinal axis of the flutes extending along a line extending outward (and preferably radially outward) from the periphery.

[0056] Referring to Figures 1-3, the flutes 39 have a generally triangular shape, with the displaced periphery edge 38 including the base 40 of the triangle. The tip of the triangular shaped flute 39 is apex 42, is located in the plane of the strap 20, but outward of the periphery of the opening 26. The flute 39 is shown as having a linearly increasing displacement in a direction parallel to axis 37, when examined at successive points along a line extending from the apex 42 to the center of base 40. Thus, the apex 42 is roughly in the plane of the strap 20 containing longitudinal axis 27, while the center of base 40 is offset from that plane, and the distance between apex 42 and the center of base 40 increases linearly. This is illustrated in Figures 9a and 9b.

[0057] The offset of the center of base 40 from the plane of the strap 20 is preferably about 1/16 inch (.0625 inches) for a strap 20 used behind drywall. The offset distance could be greater, but if the strap 20 is placed behind drywall, then the flutes 39 dig into the drywall. When viewed along axis 37, a flute 39 with an offset of about 1/16 inch has a base 40 about 1/4 inch long (a chord length) and a length along the longitudinal axis of about 1/4 inch.

[0058] As shown in Figures 2 and 3, the triangular flutes 39 forming the undulating edge 38 can abut each other at the edges of the adjacent bases 40, to provide a continuously undulating periphery of the opening 26. The flutes 39 forming the undulating edge 38 preferably extend on